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Current state and future of Paediatric Allergology in Europe: A road map

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Abstract

The history of pediatric allergology (PA) in Europe is relatively youthful, dating back to 1984, when a small group of pediatricians founded the European Working Group on Pediatric Allergy and Immunology - later giving rise to ESPACI (European Society on Pediatric Allergology and Clinical Immunology). In 1990, the first dedicated journal, Pediatric Allergy and Immunology (PAI), was founded. There are striking differences across Europe, and even within European countries, in relation to the training pathways for doctors seeing children with allergic disease(s). In a sponsored collaboration with the European Academy of Allergy and Clinical Immunology (EAACI) Pediatric Section, the EAACI-Clemens von Piquet Foundation (CvP) organised in 2016 a workshop on the future of PA with a deliberate focus on education, research and networking/advocacy. The delegates representing many countries across Europe, have endorsed the concept that optimal care of children with allergic diseases is delivered by pediatricians who have received dedicated training in allergy, or allergists who have received dedicated training in pediatrics. In order to meet the needs of children and families with allergic disease(s), the pediatric allergist is highly encouraged to develop several networks. Our challenge is to reinforce a clear strategic approach to scientific excellence to across our member base, to ensure and enhance the relevance of European pediatric research in allergy. With research opportunities in basic, translational, clinical, and epidemiological trials, more trainees and trained specialists are needed and an exciting time to be a pediatric allergologist.

Key words: allergy, anaphylaxis, asthma, children, drug, food allergy, pediatric allergology, pediatrics, training, trial

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Contributions:

OT has drafted sections of the manuscript, has prepared the figure and table, has collated and refined the individual sections of the manuscript at all stages and has prepared the manuscript for submission; PM and ZQZ have each prepared the first draft of a section of the manuscript; SSG has supported the collection of comments from the authorship with regards to the intermediate version of the manuscript; PAE and UW have conceived the idea of the manuscript as well as its structure, have supervised its progress and provided guidance to OT and LAVDP. UW has additionally prepared a section of the manuscript; LAVDP has drafted sections of the manuscript and refined intermediate and the final draft; All authors have commented on intermediate versions of the manuscript and provided approval of the final document.

Abbreviations:

PA: pediatric allergology

ESPACI: European Society of Pediatric Allergology and Clinical Immunology

PAI: Pediatric Allergy and Immunology

EAP: European Academy of Pediatrics

EPA: European Pediatric Association

EAACI: European Academy of Allergy and Clinical Immunology

CvP : Clemens von Piquet Foundation

UEMS: Union Européenne des Médecins Spécialistes

MDT: Multi-disciplinary team

GP: General Practitioner

AIT: Allergen specific immunotherapy

PIP: Pediatric investigation plan

EMA : European Medicines Agency

ETC-PA: Education Training Committee for Pediatric Allergy

HCP: Health Care Professionals

Introduction

The history of pediatric allergology (PA) is relatively youthful: in 1984 in Europe a small group of pediatricians founded the first European Working Group on Pediatric Allergy and Immunology - later giving origin to ESPACI (European Society on Pediatric Allergology and Clinical Immunology) [1]. ESPACI was a response to the need for a sub-group within the allergy community focusing on the specific unmet needs of infants and children developing atopic disease manifestations. Until that time, infants and children with, or at risk of atopic dermatitis, food allergy, asthma, allergic rhinitis, and/or drug allergy had only the choice of a general pediatrician, a specialist with a strong background in adult allergy or a specialist with a special interest but no formal training in allergy. The absence of a holistic, family-focused approach to allergic conditions may have resulted in significant additional burden with respect to the prevalence and morbidity of atopic diseases in the first years of life.

In the subsequent years, global interest in pediatric allergy research, be it basic, translational and/or clinical, grew and so did the focus on research quality. Simultaneously, sessions on pediatric allergy at international conferences increased in popularity. In 1990, a dedicated journal, Pediatric Allergy and Immunology (PAI), was founded. Now most conferences include a considerable number of paediatric sessions.

A patchwork of differential recognition for the discipline of PA developed in Europe in accordance with the fact that in some countries allergology is recognized as a full specialty, while in others it is seen as a subspecialty within e.g. dermatology, ENT, respiratory medicine and paediatrics. Early attempts to harmonise the structure of patient care in this area across Europe were unsuccessful until the European Academy of Pediatrics (EAP) officially accepted PA as a certified and acknowledged sub-speciality in 1999.

The EAACI-Clemens von Piquet Foundation (CvP) is a non-profit foundation established to promote research and education in pediatric allergy. In a sponsored collaboration with the European Academy of Allergy and Clinical Immunology (EAACI) Pediatric Section, CvP organised in Rome, October 2016, a workshop on the future of PA, with a deliberate focus on education, research and networking/advocacy. Invited delegates were the members of the CvP board and senior and junior representatives from EAACI Sections and Interest Groups related to the focus topic. These delegates represented many countries across Europe and CvP additionally invited other representative paediatric allergists. Valuable insights were requested from two experts with backgrounds in paediatric drug development, including immunotherapy. The authors of this paper were all active participants of this workshop. The paper represents an official statement of CvP and the EAACI Section on Pediatrics.

Status quo in Pediatric Allergology in Europe:

More than two decades after the EAP officially accepted PA as a certified and acknowledged subspecialty within pediatrics, there are still striking differences across Europe in the training pathways for doctors seeing children with allergic disease(s). The types of doctors currently engaged in PA in Europe can be outlined as followed:

1. Those fully trained in general paediatrics with (extra) dedicated time in allergy. These are pediatricians who have a special interest in allergy and the allergy-dedicated training duration varies among countries eg in UK where this is known as SPIN (special interest) in allergy and tends to be for those who wish to work in secondary service with dedicated allergy clinics.
2. Those trained where PA is a subspecialty within pediatrics, namely through an (integrated) general pediatrics (core) training and full specialist allergy training programme leading to accreditation as pediatric allergists. In these countries, PA is regarded as a full (sub)specialty eg Sweden, Turkey, Denmark and UK. Subspecialty paediatric allergy training in the UK is a 3-year programme approved by the Royal College of Paediatrics and Child Health and subspecialty accreditation is awarded by the General Medical Council; this is the usual route to working in a tertiary or academic UK allergy unit. In Turkey, after 5 years of general pediatric specialty the pediatric immunology and allergy training is an independent 3 year full specialty programme. Of note, in some countries, pediatricians that have been dedicated to seeing allergic children for a specified sufficient period of time have been granted accreditation as pediatric allergists (such as in Spain with pediatricians consulting allergic children for 5 years or more).
3. Those who have completed core training in adult general medicine and, in some cases, a short or equal period of paediatrics, followed by a combined clinical training in child and adult allergy. These are allergists and allergy is considered as a full (sub)specialty. Representative examples of countries implementing this training system is Greece, Portugal, Spain, France and Romania.
4. A fourth setting exists where allergy is not regarded as specialty and the onus is on the individual physician to train themselves to feel confident in seeing children with allergic problems. This may happen in the case of adult ENT and ophthalmology surgery specialists in Germany, for example, and the Workshop agreed this situation is suboptimal for both the patients and the physicians involved. This setting includes many clinicians appointed to posts in the 1990s and 2000s.

Accepted Article

It is also vital to acknowledge and consider the experienced non-medical health care professionals (HCP) who support and add value to the optimal diagnosis and management of allergy in children. Countries differ in the training and utilisation of allied HCP within in the allergy teams. Specialist nursing and dietetic clinics already occur in some allergy centres in the UK and Scandinavia [2]. However, to date, the authors are unaware of an accredited curriculum and certification in allergy, although ratified 2-year training programmes for asthma or eczema exist. This issue could and should be addressed with the appropriate stakeholders.

All delegates of the workshop have endorsed the concept that optimal care of children with allergic diseases is delivered by pediatricians who have received dedicated training in allergy, or allergists who have received dedicated training in pediatrics. Therefore, the proposed way forward is for only these specialists to be accredited to consult children with allergic diseases in the near future. Nonetheless, the panel acknowledges the idiosyncrasies of each country's specialty training programmes. Respect is given to the fact that there are allergists with general adult medicine as their background who have been seeing allergic children routinely, especially in light of the absence of pediatric allergists in their country. On this basis and for the time being, doctors currently engaged in PA who have not undergone pediatric training but can demonstrate the necessary skills and competencies can still be considered to be accredited as pediatric allergologists, akin to the Grandfather clause that allows continuing practice for those appointed/ in post before formal accreditation processes were established. In countries where PA is an acknowledged specialty or where there are EAP-certified PA centres, accreditation can take place through a formal application of the doctor to the PA national society or PA centre of the country respectively. The role of the ETC-PA in individual certification of European Specialists and Centre certification has been key to the development of PA in Europe. Although not a legal licence to practice, this certification is an important asset to an individual CV, particularly in countries where PA does not officially exist and may also help to give visibility to the subspecialty and to influence its recognition. It is also a prerequisite to accredit training Centres, since teachers must be qualified and recognized as such. After international visitation and accreditation, all involved centres to date (6 in Spain and 7 in Sweden) agreed that this initiative led to an improvement in teaching quality, clinical quality, planning of training and training of techniques. Of note though, it is up to national bodies to acknowledge subspecialties and to define the rules for training centre accreditation and subspecialist certification in their countries. These rules should ideally be similar all over Europe. In countries where a given subspecialty is not recognized, the international certification of centres may play a crucial role in promoting the visibility and final recognition of this field as a specialized area of medicine in that country.

Education according to the EAP European Paediatric Allergology Training Programme

The European Paediatric Allergology Training Programme was firstly approved in 1999 and revisions made until a consensus syllabus was approved in the end of 2016 [3]. It is one of the subspecialist training programmes in tertiary care paediatrics, defined by the Tertiary Care Group of EAP, itself the Paediatric section of the European Union of Medical Specialists (Union Européenne des Médecins Spécialistes - UEMS). Based on this programme, pediatric allergists are expected to practice their skills and apply their expertise within the framework of a specialized Tertiary Care Unit. These specialists will also have the commitment of training general pediatricians and pediatricians with interest in PA.

Accepted Article

According to this Training Programme, all doctors practicing PA require a prescribed and nationally accredited basic training in general pediatrics, as set out by many National Training Authorities, and the recommended European Common Trunk Syllabus, approved by the EAP-UEMS. This programme stipulates 3 years minimum in general pediatrics, serving as a prelude to PA. In some countries, a clinical training period of 24 months full-time employment in PA is considered adequate, but others require longer for accreditation.

Nevertheless, the content or competencies demonstrated and not the length of education *a priori* should be the basis of PA subspecialty certification. A precise Training Syllabus [3] is detailed in the European Pediatric Allergology Training Programme. This is structured in modules, each containing training requirements in a specific area, expertise, or skill. Simultaneous training in several modules is possible, according to local service and training configurations. Training can be completed with modules acquired in several different training centres, with at least one named, trainer-recognised primary centre. Immunology is regarded as an add-on module and in some countries a separate subspecialty. Immunodeficiencies are not officially included in the PA curriculum.

Competency-based assessment, as an adjunct to knowledge assessment and portfolio completion, is an important aspect of evaluation. Several countries have recently reformed their postgraduate medical education and competencies should be evaluated throughout the training period. PA trainees are encouraged and required to keep a contemporaneous written log-book of patients they have seen, together with procedures conducted, and the therapeutic interventions instigated and followed-up. This will constitute part of their portfolio.

Research training is considered an essential aspect of the PA curriculum. Furthermore, attendance at International Congresses and giving 2-3 presentations in such meetings is highly recommended.

Pediatric Allergy Exams

A knowledge-based assessment is desirable and preferably included in a national final exam. EAACI is currently organising a modification of the EAACI Knowledge Exam which offers an official knowledge certificate for allergists/clinical immunologists. This modification will lead to a specific certification for pediatric allergists on a European and global level. This will impact on the implementation of structured pediatric allergy care in all European countries. In addition, it could offer an optional replacement for the knowledge-based assessment of PA national certification, provided it is accepted by the relevant national authority. These EAACI Exams on PA are anticipated to help the harmonization of education and exchange of young doctors in the PA field across Europe. Moreover, this kind of certificate will be of value for national validation. While the exam may not replace the established training and rules for the specialty foreseen by each nation, this kind of certificate will be of value as an additional qualification.

Networks for pediatric allergists across Europe

In order to meet the needs of children and families with allergic disease(s), the pediatric allergist is highly encouraged to develop several networks (**Figure 1**). Engaging with different groups facilitates education, training, clear communication, creates the opportunity to develop shared pathways for patients, as well as for recruiting potential experts in the field.

i) Multi-disciplinary team (MDT) pediatric allergy clinics

Pediatric subspecialty services are becoming increasingly multi-disciplinary. Proposed members of the allergy MDT include pediatric allergists, specialist nurses, dietitians and psychologists. The ideal is to have a “one stop shop” model where children and their families attend paediatric allergy clinics composed of MDT members. The skillset of the MDT is diverse and may overlap; generally, medical clinicians have overarching responsibility for patients, dietitians can guide exclusion diets and reintroductions as well as ensure the child’s nutrition is complete, and nurses usually support food and drug challenges, perform allergy tests, as well as ensure emergency plans are in place. In addition, nurses most often liaise with schools in order to ensure the child is safe in the community – this can involve visiting schools or training school nurses to recognize and treat allergic reactions. The roles of MDT members are expanding; many centres are developing nurse-led and dietetic-led clinics where clinically appropriate, which increases access for patients. This creates opportunities for focused and practical education and quality of life improvements. The ‘one-stop shop’ model makes holistic patient care more efficient. MDTs could be even broader and include liaison with allergy-related pediatric subspecialties, such as ENT, respiratory, gastroenterology, dermatology and ophthalmology teams. There are centres which have set up joint clinics where patients are assessed by sub-specialists simultaneously – the provision of this service mostly depends on local resources.

ii) Primary care

In many European countries, the majority of patients with allergic disease(s) will consult first with their primary care giver [e.g. general practitioner (GP) in the UK, general pediatrician in Switzerland]. Remarkably, one third of all UK GP consultations in 2007 were due to allergic diseases. Although pediatric allergy networks and national societies are engaged and annual meetings well attended, they infrequently involve the primary care giver. Establishing links with primary care givers will create opportunities - for education and training, as well as to facilitate prompt referrals and shared care for patients. Regional networks can be a way of involving primary care in continuous education and pediatric allergists must reach out to primary care where time for training might be scarce. Other initiatives include EAACI primary care symposia during EAACI meetings and adaptation of an EAACI masterclass in PA for primary care physicians.

iii) Regional networks

In some European countries, regional networks are increasingly popular, as they facilitate education and information dissemination among pediatric allergy MDT across the region. Tertiary centres tend to co-ordinate meetings, with attendance from MDT members from secondary care hospitals and occasionally by primary care. There is opportunity to collect regional data eg for asthma, food challenges, creating regional guidelines e.g. standardized food challenge, referral pathways for drug allergy, or even to conduct audits. Most importantly, there is an opportunity to discuss cases, be it simple or complex, among experts from the tertiary centre. We strongly support the constitution of regional clinical networks led by trained and experienced pediatric allergists, and including physicians and allied health professionals involved in the care of allergic children and adolescents. Clinical and research networks also need to focus on strategic partnerships and collaboration with adult colleagues to better understand how to support each other’s needs and to align activities.

iv) International networking

Well-established PA centres can offer great support to centres in other countries where PA is emerging. Short, as well as longer term, visits to both sides of the network should be encouraged, not only for trainees, but also for established professionals. Moving to a country with a higher cost of living is a major problem impairing the ability to take up a training or sabbatical position. Fostering and supporting the activities of pediatric allergists in their local centres as well as exchanges across clinical and research networks allows growth of expertise and sharing of ideas. With this in mind, it has been noted that fellowship grants and training opportunities should be available to those who are still or have just completed their training but no longer qualify for junior membership eg at EAACI. Similarly, consultants in post have expressed the wish to learn from other centres in a way which realistically allows useful networking and cross-pollination of ideas.

Certification of PA centres for training through ETC-PA should be encouraged. Certified centres will be identified as resource centres for exchange, and will testify to a high level of clinical care. In addition, it is important to acknowledge centres that provide excellent clinical or research exposure to specific aspects of PA, to avoid oversubscription of well-known centres and to engage and develop new centres of excellence.

v) Medical students and pediatric trainees

Provision of allergy teaching within the undergraduate curriculum is variable throughout Europe. Medical schools might allocate a most commonly restricted time for undergraduate allergy-teaching. It is vital that undergraduate medical students are exposed to the specialty – this will stimulate interest and enthusiasm in individuals who may become future specialists in the field. Similarly, allergy training should be offered to pediatric trainees in order to generate interest and recruitment into PA.

vi) Social media and modern communication Apps

Digital tools are useful for communication among healthcare professionals who provide pediatric allergy services. In Turkey, for instance, a closed WhatsApp group was created in order to facilitate case discussions among HCP who deal with children with allergic disease(s).

Facebook is a popular platform for patients / families to interact. Similarly, Twitter has been gaining increasing interest the last years in the medical community as its users can:

A) follow a Journal's latest articles (eg through the hashtag #PAI_Journal for all PAI papers) or many of the key messages presented in Meetings' sessions (eg via #EAACI2017 for all twitter posts on the EAACI Congress 2017),

B) participate in twitter discussions meant either for professionals (eg via #AboutAllergy for twitter discussions organized by EAACI) or patients and lay public (eg through #AllergyReady).

These potentially powerful learning and communication tools also require some guidance for optimal clinical conduct and governance and need to be identifiably distinct and separate from ungoverned patient/ parent sites which are not backed by science and medical expertise. For all information in the public domain, strict patient confidentiality has to be adhered to, in accordance with local trust guidelines. EAACI has an annex dedicated to the proper use of social media by HCP as part of the EAACI code of ethics [4]. In time, there is likely to be a need for formal education on this included as part of training.

vii) Media

Pediatric allergology is a topic of wide interest to the media. Aside from social media, some may find it useful to engage with the traditional media of communication in order to ensure seamless dissemination of the correct information. Effective and co-ordinated communication can avoid negative publicity due to fatalities, near-misses from food anaphylaxis, for example, or may be better presented as a result. Additionally, effective liaison with and through the media should be communicated at national and EU level aiming at promoting the prioritisation of allergic diseases.

viii) Patient organisations

Pediatric allergists engage with and support professional patient organisations in order to further support families. This creates an educational opportunity – ensuring that scientific information is understood by patients and families for better outcomes.

ix) Pharmacists

In addition to their knowledge of medicines, pharmacists also provide advice, information and treatment for a number of chronic conditions and play a vital part in health promotion and disease prevention initiatives. Pharmacists are educated to support patients manage medicines and their side effects effectively [5] while they contribute to improved patient adherence. Therefore, they are important liaisons for pediatric allergists and can further contribute to increased awareness of allergic diseases.

Current state and future of pediatric allergy research in Europe

Recent years have seen significant advances in our understanding of allergenic pathophysiology and tolerance induction. Work is underway to assess the generalisability and feasibility of practical recommendations for optimal public health impact. There are also several new therapeutic drug options becoming available which need paediatric trials. With research opportunities in basic, translational, clinical, epidemiological and drug trials, more trainees and trained specialists are needed. It is certainly an exciting time to be a pediatric allergologist!

Our challenge now is to develop a clear strategic approach to scientific excellence to across our member base, to ensure and enhance the relevance of European pediatric research in allergy (Table 1). Several key areas for potential investment include:

i) Prevention of allergic disease(s)

Research is ongoing for the prevention of eczema, food or respiratory allergy, or required in the epidemiology of allergy; genetics, immunology, molecular and cellular mechanisms of the allergic immune response and for drugs suitable for children.

Basic science research is underrepresented in pediatric medicine and this should be strategically highlighted to the EU and national funding agencies. Recent studies have made significant inroads into understanding the pathophysiology of tolerance induction, as well as the specifics of primary food allergy prevention. These messages necessarily lead to further epidemiological and clinical translational and intervention studies. Pediatric medicine is a fertile research ground for cohort studies but, for reasons not fully explored in the remit of this paper, it has been historically weak on trials and this is due to change.

ii) Diagnostic tools and management in PA

Better child and young person-centric diagnostic tools are needed to avoid misdiagnosis or unnecessary positive challenges. In vitro diagnostics appear promising with respect to predicting positive food or drug challenges, but there is much work to be done in relation to easier and accurate diagnosis of non-IgE allergy. Research in diagnostic biomarkers also needs to take into account if, and how, the potentially different physiology of children is important at different age-ranges. Accurate and earlier diagnostics for allergic diseases and risk of development would help prevent missing the window of opportunity and thus optimise chances of primary and secondary prevention.

At the same time, effective research in drug allergy in children - and more effective means of navigating difficult and slow processes related to drug research in children - is much needed. An example of important public health intervention resulting from such research is the removal of pholcodeine from over the counter products, such as children cough syrups. The wide-scale reduction in exposure to this allergen means potentially fatal anaphylactic reactions to neuromuscular blocking drugs may be prevented.

Allergen specific immunotherapy (AIT), first described in 1908, has recently been rejuvenated with respect to oral, epicutaneous, sublingual or subcutaneous modalities for food allergy as well as with the introduction of peptides instead of whole extracts against allergic rhinitis [6]. More child-friendly and better access to AIT is required, as is better standardisation and training. Ongoing surveillance of adverse side effects and tolerability as regards quality of life is imperative.

i) New drug development and trials for paediatric safety and efficacy

It is known that drugs for neonates, infants and very young children need to be reviewed with respect to drug absorption, distribution, metabolism and excretion and the implication on drug usage, especially dose. However, for older children, despite acknowledgement that brain maturation may take till up to 25 years, characteristics may be as for adults. Of note though, EU pediatric regulation requires a paediatric investigation plan (PIP) for every new drug as a condition for marketing approval.

It is important to discuss that AIT products in the EU were exposed to two key legislations in 2007/2008: a requirement for PIP submission, and the German therapy allergen ordinance [7]. The latter made it mandatory for manufacturers to register every AIT product, despite being in use for decades. As Germany is the largest market for AIT products, this affected all allergen AIT manufacturers in Europe. More than a hundred PIPs were submitted in short time, resulting finally in a massive study programme proposed to involve 58 five-year double blind randomized placebo-controlled allergen AIT safety & efficacy trials with several hundred participants. The deadline for these studies is December 2031. While aspects of current AIT products on the market need appropriate study and review, there is concern that the requirement for participation of thousands of children and adolescents potentially leaves children at risk of unnecessary morbidity and, those assigned to placebo groups, at risk of progression or march of allergic disease.

Many clinical specialists are unaware of this issue and would rationally question the necessity of trials which would hold up the ability of children to benefit from medications that have been proven to be of benefit in adults. The PIP system is due for discussion in the EU parliament, and it is hoped that representatives from PA and EAACI will raise their voice together with those from other pediatric specialties [8] to review the EMA's position which risks suffocating pharmaceutical innovation.

ii) Innovation and technology

Innovation and technology for better personalised clinical care, public health and research tools is a growing and rapidly changing field. EAACI is already cognisant of this fact and a mobile-health task-force has been created to evaluate and develop the organisation's approach. The promise is of more effective tools to monitor patients, to educate patients or professionals and to improve adherence. These potential benefits need to be rigorously evaluated to assess the true impact and whether or not the mobile health or digital tools are indeed effective in improving education, adherence and self-efficacy in the management of allergic diseases. Collaboration and engagement with primary care and public health as well as extra pediatric groups, such as health economists and appropriately skilled tech expertise will be required to inform assessment and trials.

iii) Improved strategic communication and collaboration

Improved strategic communication and collaboration is related to public health, economists, regulatory bodies, the lay public and the press. Pediatric allergists must be strong advocates for their patients.

iv) Fostering Networks for research

The need for the development of pan-European registries to facilitate research and care was highlighted in an EAACI statement by Professor Papadopoulos et al in 2012 [9]. As an example of the valuable information a registry can carry, the European Anaphylaxis Registry has recently provided significant epidemiological information on the eliciting factors of anaphylaxis in children and adolescents [10].

At the same time, a key area for development is the identification of clinical centres involved or interested in the care and research work in PA. They will represent a platform for research collaboration and communication in the form of registers or clinical networks. Currently, these arise on an ad hoc basis for studies, but maintained networks with established leads and contact points are likely to facilitate research integration into clinical practice both in the study phase and at implementation of new guidance. A drug allergy network exists currently.

Planning ahead

A strategic plan to enhance PA as a specialty should focus on its unique strengths and aim to minimise its weaknesses. A focus on pediatrics and on primary, secondary and tertiary prevention also favours health promotion and cost-effectiveness of EU health systems. PA requires a defined expertise, while immense research and increased interest is taking place in this field. PA, as a pediatric subspecialty, has the gratifying ability to intervene early and to improve health and quality of life of allergic children, adolescents, and their families, over the long term. Nonetheless, pediatric allergology is currently not recognised in all countries, and there is a lack of visibility and awareness of the benefits of implementing this subspecialty. The wide diversity between nations and the differential approach of health implementation priorities will continue to be a basis of weaknesses for PA.

Opportunities are emerging from the rising number of allergic children and PA has the possibility to modulate disease progression and, potentially, to provide primary prevention. Allergy at all ages is still under-recognised as a health issue by other specialties, as well as by government bodies and this has adverse implications for health and research budgets.

Journals publishing on paediatric allergy should inspire and demand quality and timely research by ensuring high acceptance standards, critical expert reviews, rapid turnaround times, and electronic publication.

In order to ensure a positive future for groundbreaking pediatric allergy research, the roadmap ahead should provide mentorship and support for juniors, as well as for established researchers. The appropriate signposting of existing support and resources including specific expertise, mentoring and research post and funding opportunities is essential. The role and importance of national member organisations is key to the grassroots support and growth of these ideas and the promotion of and for paediatrics in allergy clinical guidance, training, research and policy. EAACI and other Europe-wide or international organisations need to provide strategic support to pediatric inclusion in these spheres and EAACI already actively support the inclusion of meaningful pediatric recommendations in their guideline work.

Conclusion

PA as a sub-specialty is being better recognised and a universally acceptable standard for training and accreditation is being refined. Original research should be promoted, as well as outstanding review articles for key topics. The rapid publication of meeting reports, with the aim to provide both an overview and a discussion of the latest advances presented in pediatric research would be welcomed.

The role for EAACI, and similar organisations world-wide who wish to prioritise the agenda for PA needs to include: broadening of national representation, lobbying for recognition across stakeholder countries, the free movement of realistically funded specialists in training and accurate and well-communicated reports on the economic benefits of disease control and prevention for commissioners, policy and funding bodies. These efforts ultimately have one aim - to improve the health and quality of life of children predisposed to and suffering with allergic disease.

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Table 1: Key areas for investment in Pediatric Allergy research

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| <ul style="list-style-type: none"> ❖ Prevention of allergic disease(s) ❖ Better diagnostic tools and evidence-based management ❖ New drug development and trials, more streamlined, ethical and relevant processes and regulation ❖ Innovation and technology for better personalised clinical care, public health and research tools Improved strategic communication and collaboration with public health, economists and regulatory bodies and the public and press ❖ Fostering Networks for research |
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Figure 1, legend: Networks for pediatric allergists across Europe

